



Intel® Xeon® Processor Server Technology Update

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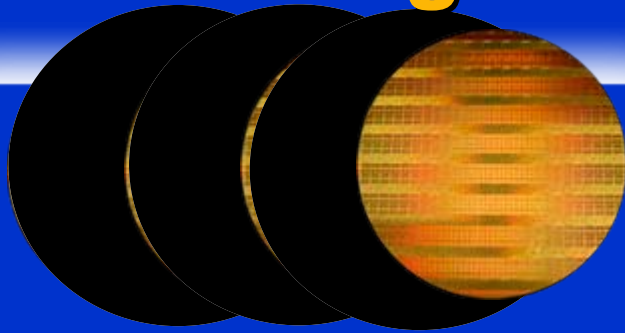
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The Winning Formula



65nm Process



New
Microarchitecture

+

*Ramping Dual Core
Everywhere*

*Best Roadmap
in Years*



Platforms

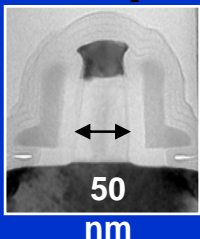
*Leadership Platforms
in Each Segment*



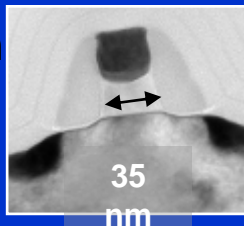
Process Technology Summary

- Only Intel has the process technology pipeline
 - Follows Moore's Law on 2-year-cycle
 - 65nm production Q4'05: > 1-year-lead over competition
 - 45nm prototype Q1'06; production 2H'07
 - 65nm/90nm cross-over Q3'06
 - Tech options '07 and beyond
- Process tech is an important competitive advantage for Intel platforms
 - Industry-leading low-leakage transistors provide a solid foundation for energy efficient performance
 - World-class yield, die size advantage, and leading-edge capacity

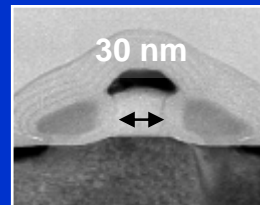
90 nm
2003



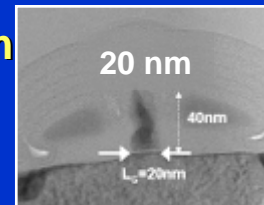
65 nm
2005



45 nm
2007

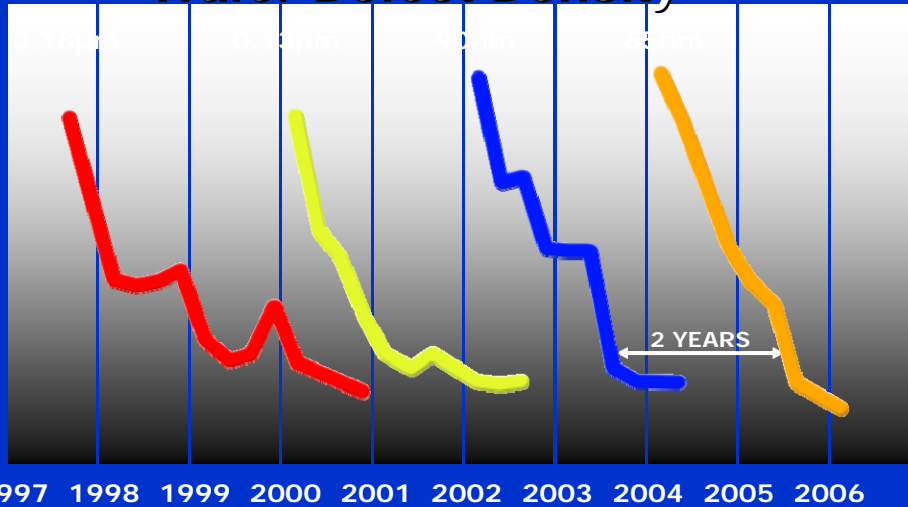


32 nm
2009

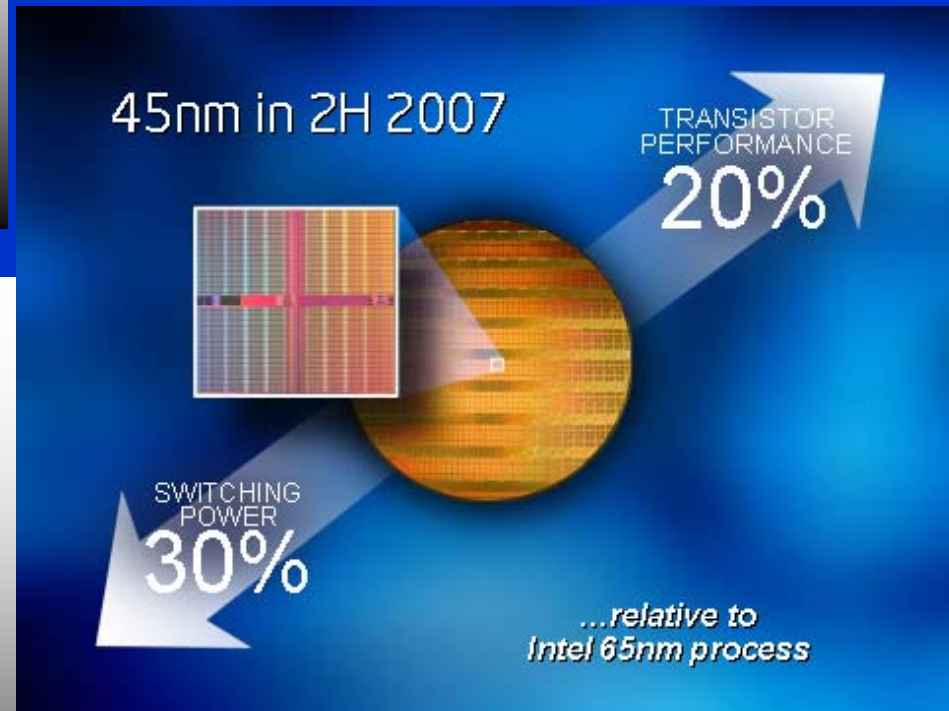
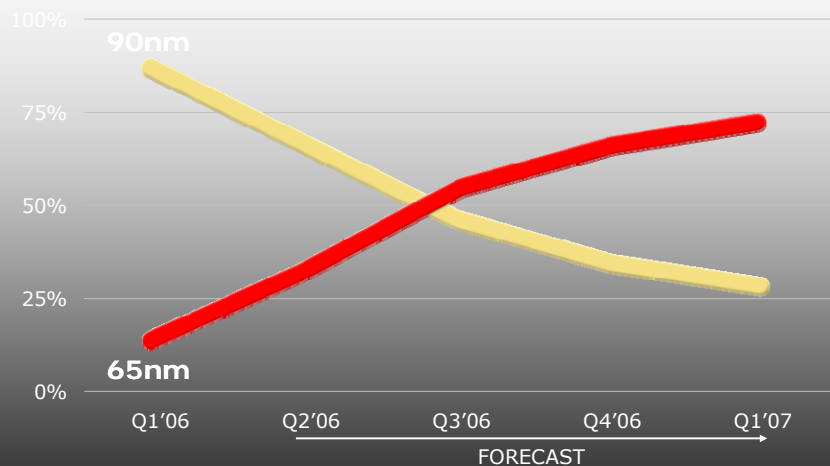


Intel's Technology & Manufacturing Pipeline

Wafer Defect Density



CPU Shipments (90nm vs. 65nm)



Rapid Dual Core Ramp



Intel® Core™ Micro-architecture Products

Shipping Soon
(2006)

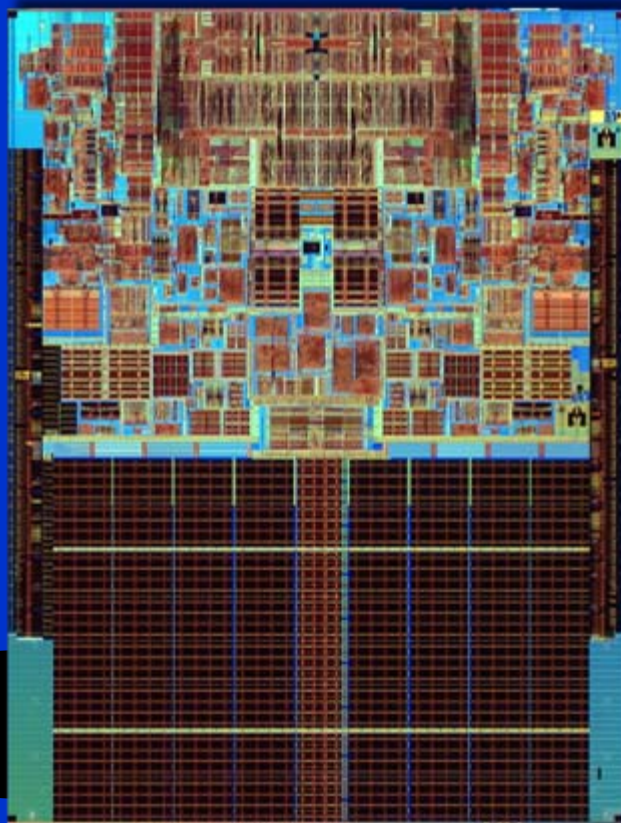
Intel® Wide
Dynamic
Execution

Intel®
Intelligent
Power
Capability

Intel®
Advanced
Smart Cache

Intel® Smart
Memory
Access

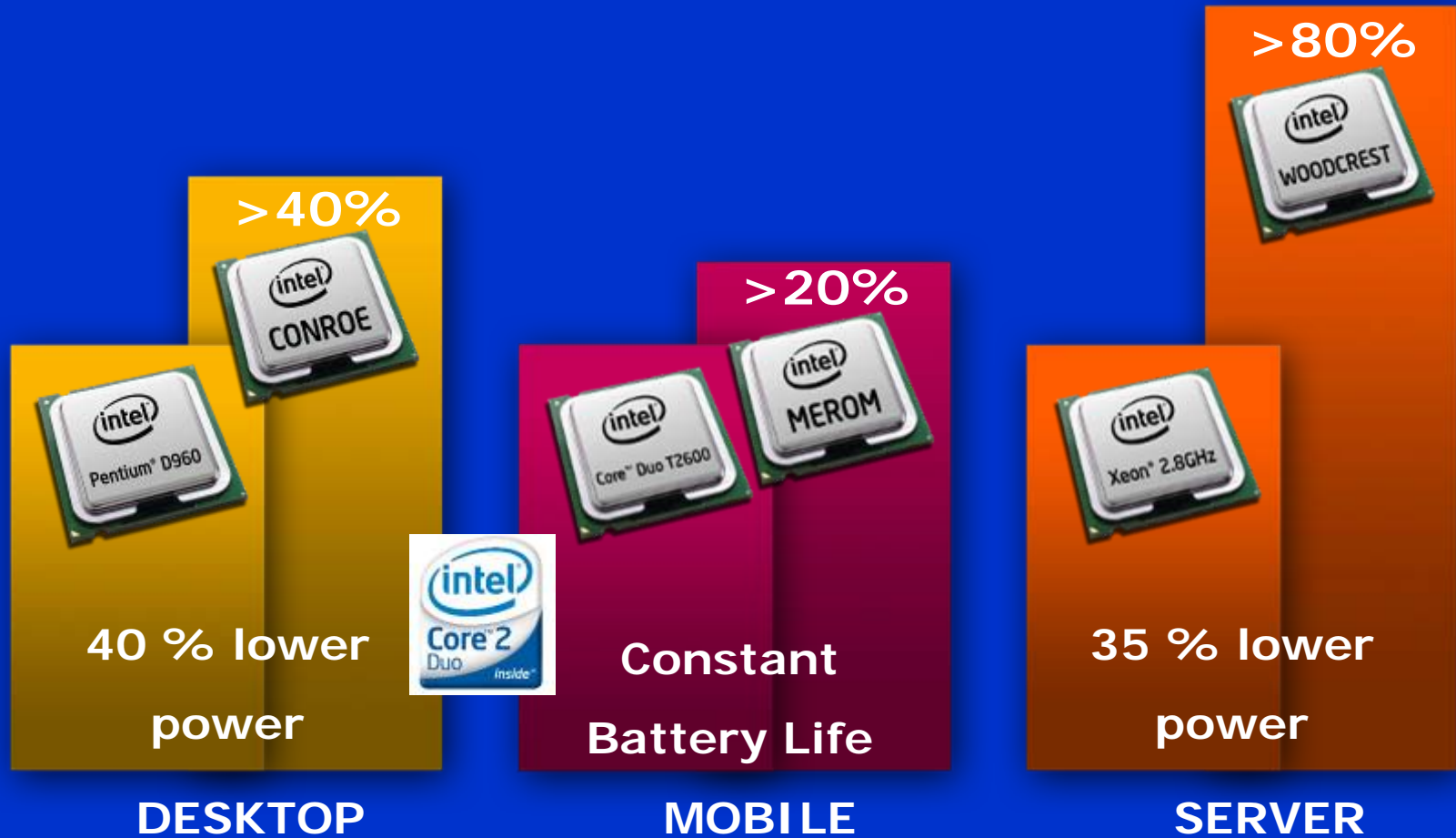
Intel®
Advanced
Digital Media
Boost



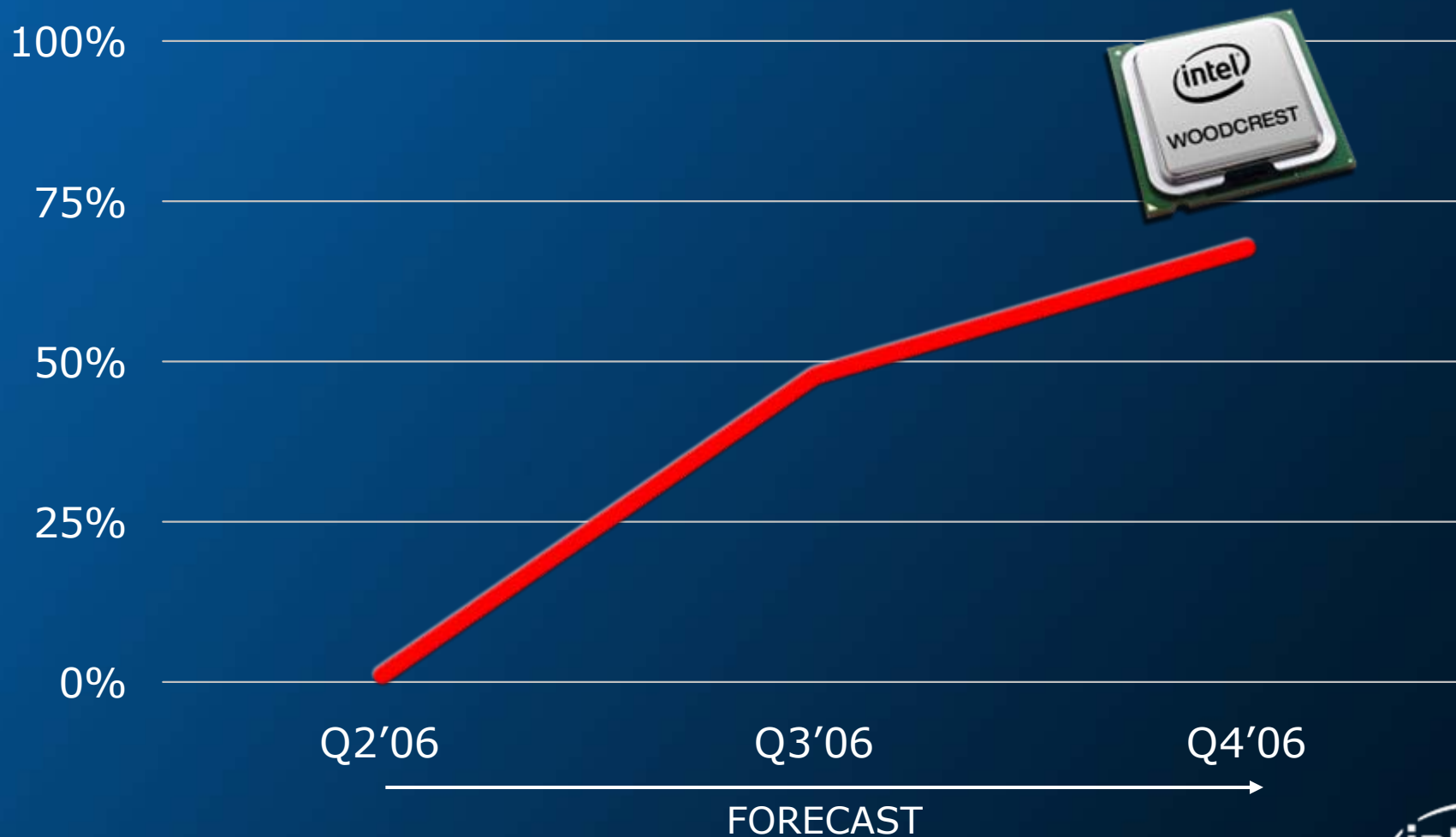
World Class Performance & Energy Efficiency



Performance & Power



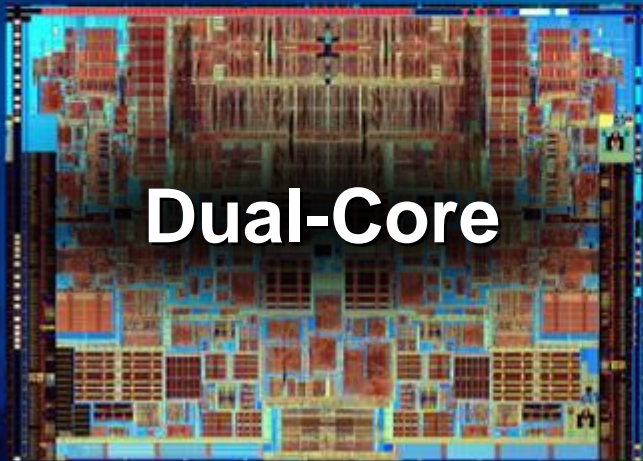
Woodcrest Ramp



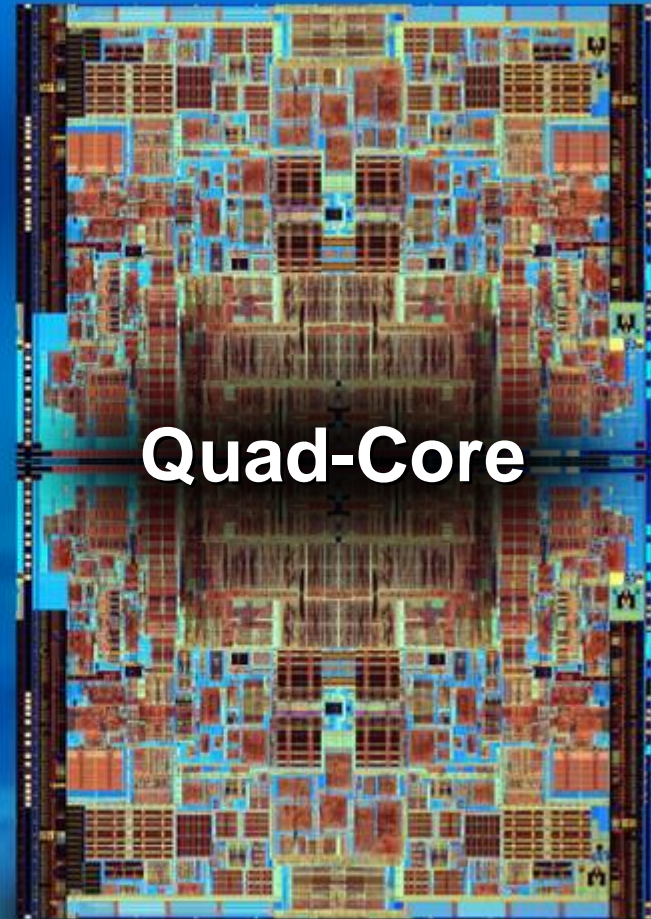
Source: Intel, % of Total Xeon® DP Shipments



Multicore Trajectory



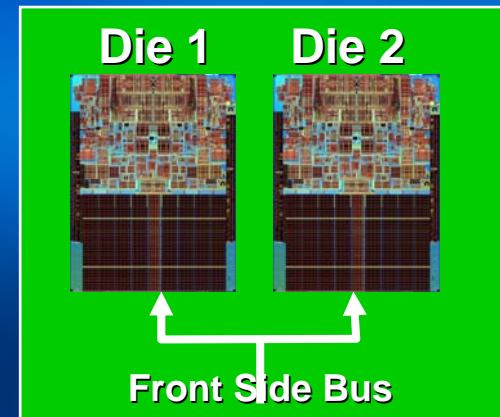
2H 2006



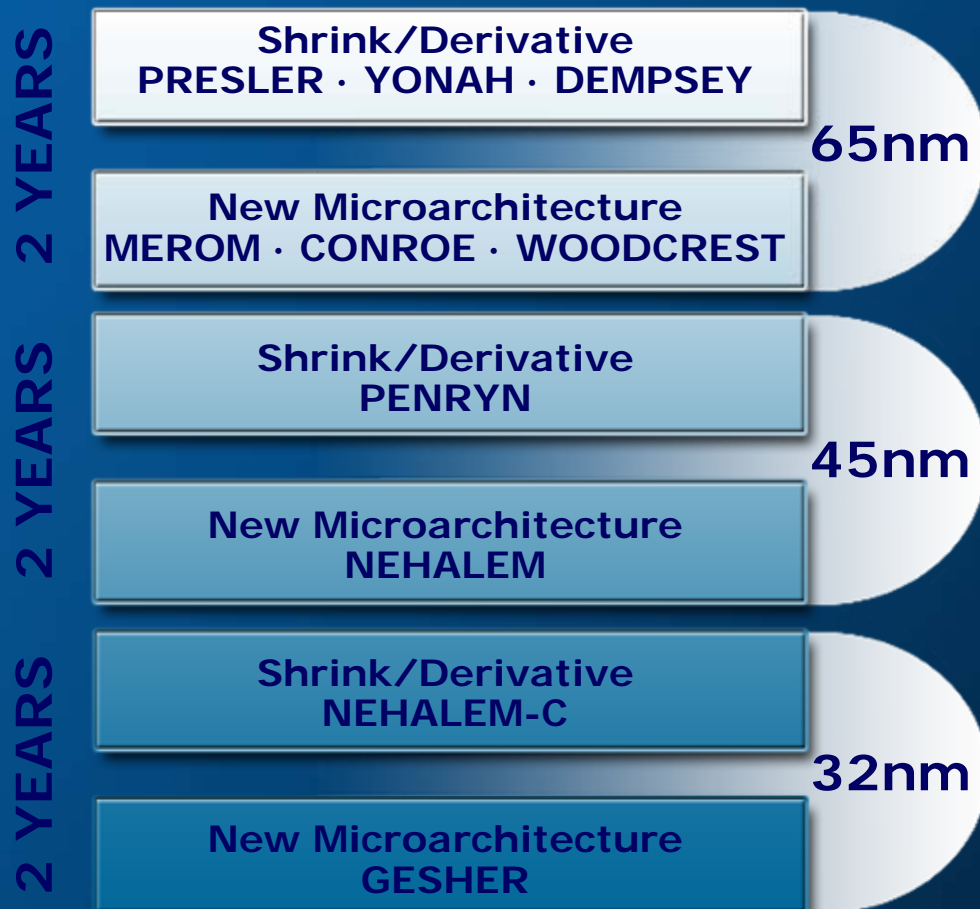
1H 2007

First Quad Core in 2007

- Two die in a single package
- Faster Time To Market
- Less Engineering Resources
- Two smaller die yield better than a double sized die
- Shared wafer start with dual core
- Ability to match Fast-Fast and Slow-Slow die for better bin splits



Microprocessor Design Model



PRINCIPLES

1. One micro-architecture for all high volume market segments
2. Optimized for performance/watt
3. Parallel design teams
4. No waiting on new process technology
5. Chipset cadence offset for fast ramp

OBJECTIVE: Sustained Technology Leadership



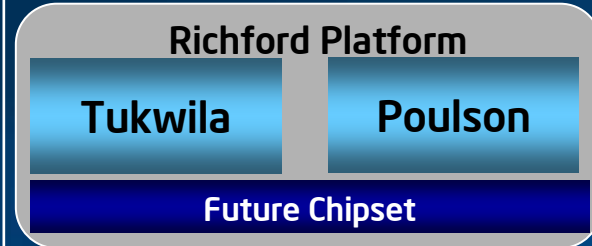
Intel® Server & Workstation Platform Roadmap

2006

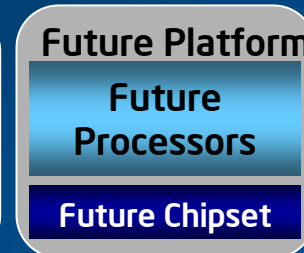
2007

Future

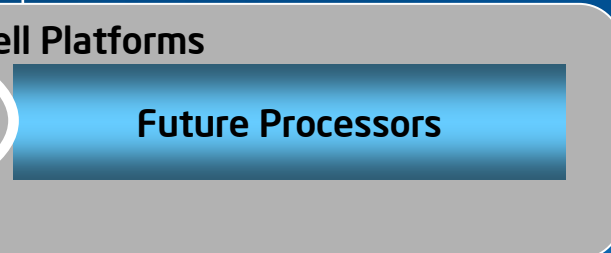
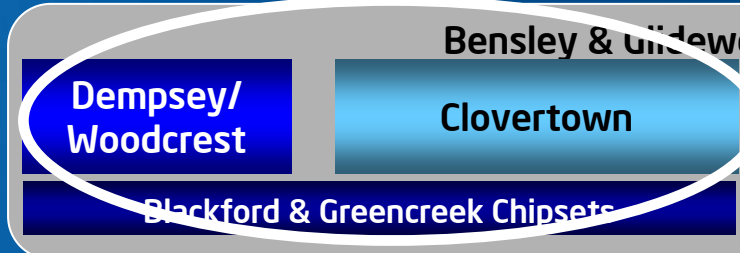
Intel® Itanium® 2
9000 Sequence



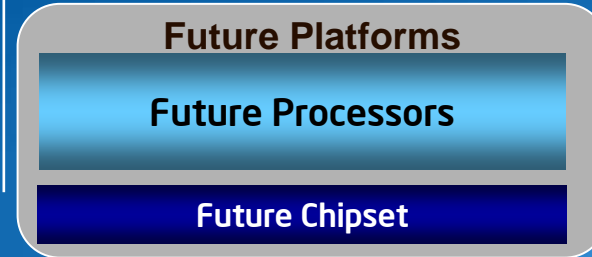
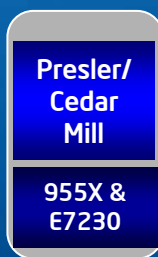
Intel® Xeon® MP
7000 Sequence



Intel® Xeon® DP
5000 Sequence



Intel® UP Server
& Workstation



Forecasted Data

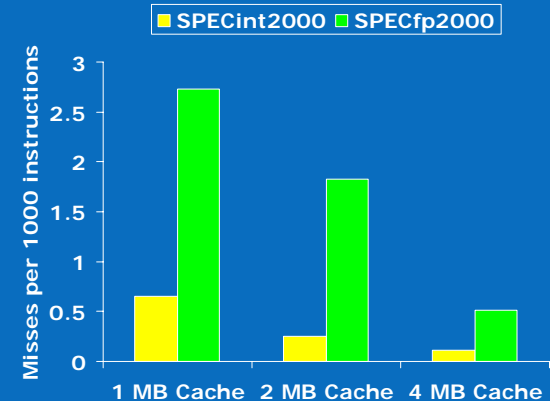
Dual Core

4+ Cores

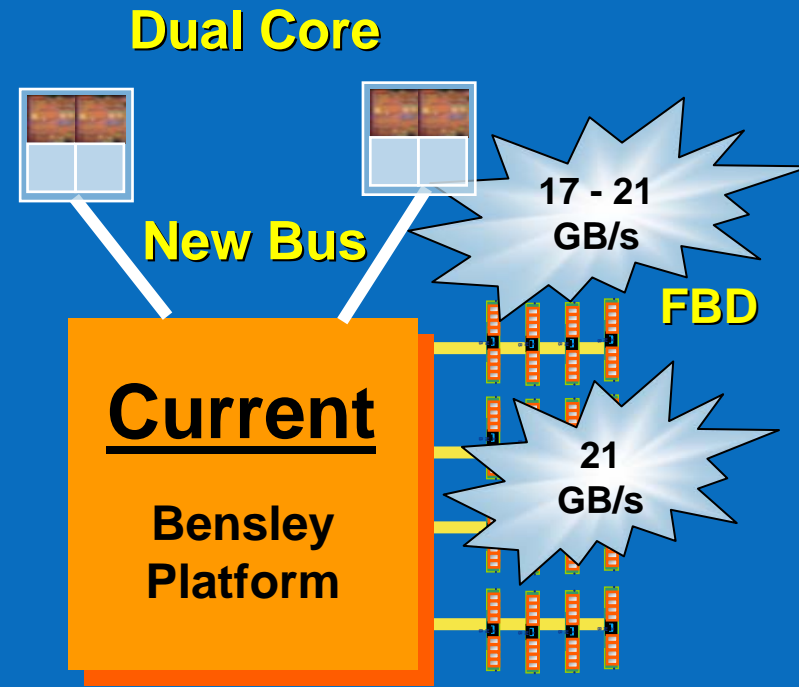
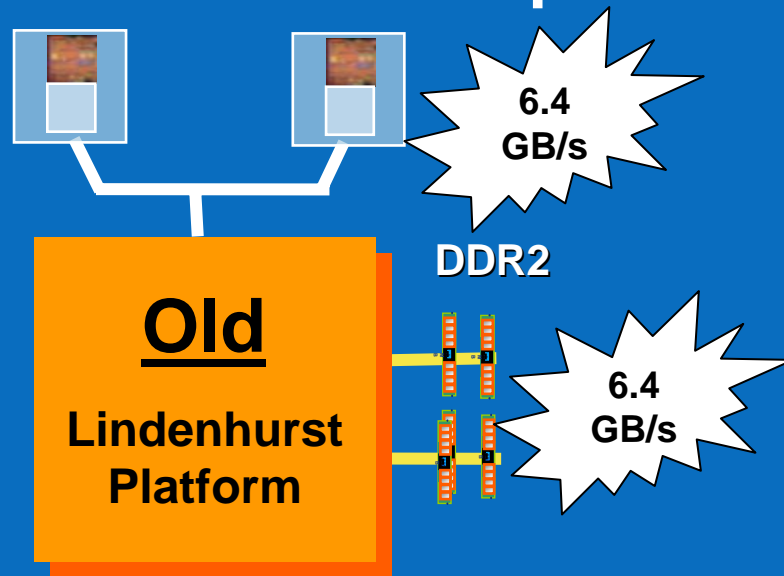


Memory Controller Integration

- Benefits
 - Lower idle memory latency to local memory
 - Eliminates the MCH as an extra component
- Disadvantages
 - Increased CPU die size and power
 - Tied to a specific memory technology (typically older)
 - Requires more pins on every CPU package
 - Full Memory capacity requires all CPU sockets to be populated
 - Full Memory bandwidth requires all CPU sockets to be populated
 - Non-uniform memory access latency
- Other factors
 - Large caches reduce memory usage and reduce impact of latency
 - Loaded latency adds queueing delays on top of idle latency
- Intel can deliver leader performance without integrated memory controller



Old vs. New: A Platform Comparison



	Lindenhurst / 2004	Blackford/Greencreek	Current vs. old
FSB BW peak	6.4 GB/s	17 to 21 GB/s (1066MHz, 1333MHz respectively)	up to 3x
Memory BW peak	6.4 GB/s	up to 21 GB/s (FBD-667)	up to >3x
Memory Capacity	16 GB (DDR2-400)	Up to 64 GB (FBD)	up to 4x

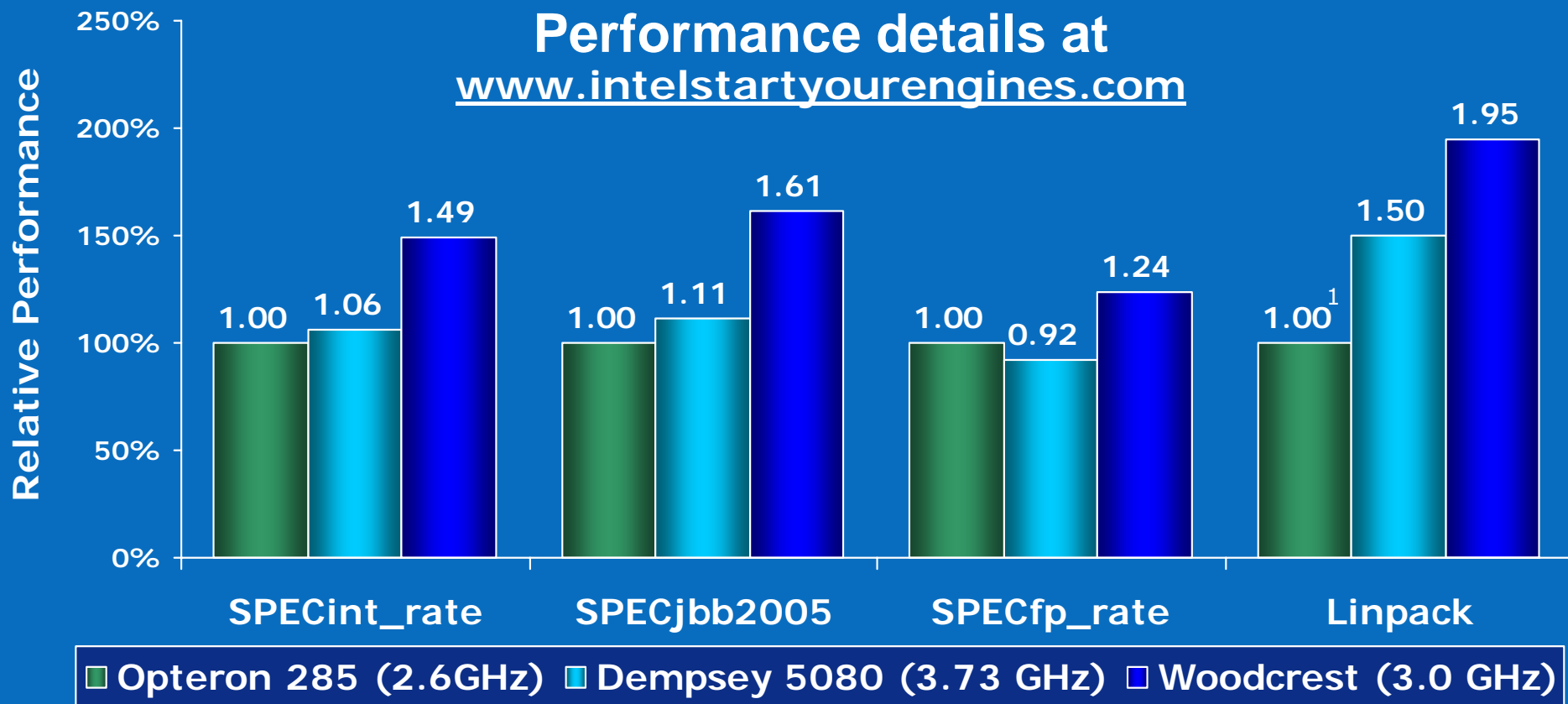
Balanced Platform Performance

More Bandwidth & Capacity → Headroom for the Future



64bit Dual-Core Performance

Based on Best Published or Measured Results



Expected to have Leading performance

1 – Opteron 285 published result not available, best published result from AMD.com is with Opteron 275.
2.6 Ghz scaled with frequency from 2.2 GHz.

Opteron & Dempsey based on published results as of 3/22/06, Woodcrest based on Internal measured results, Details in Backup

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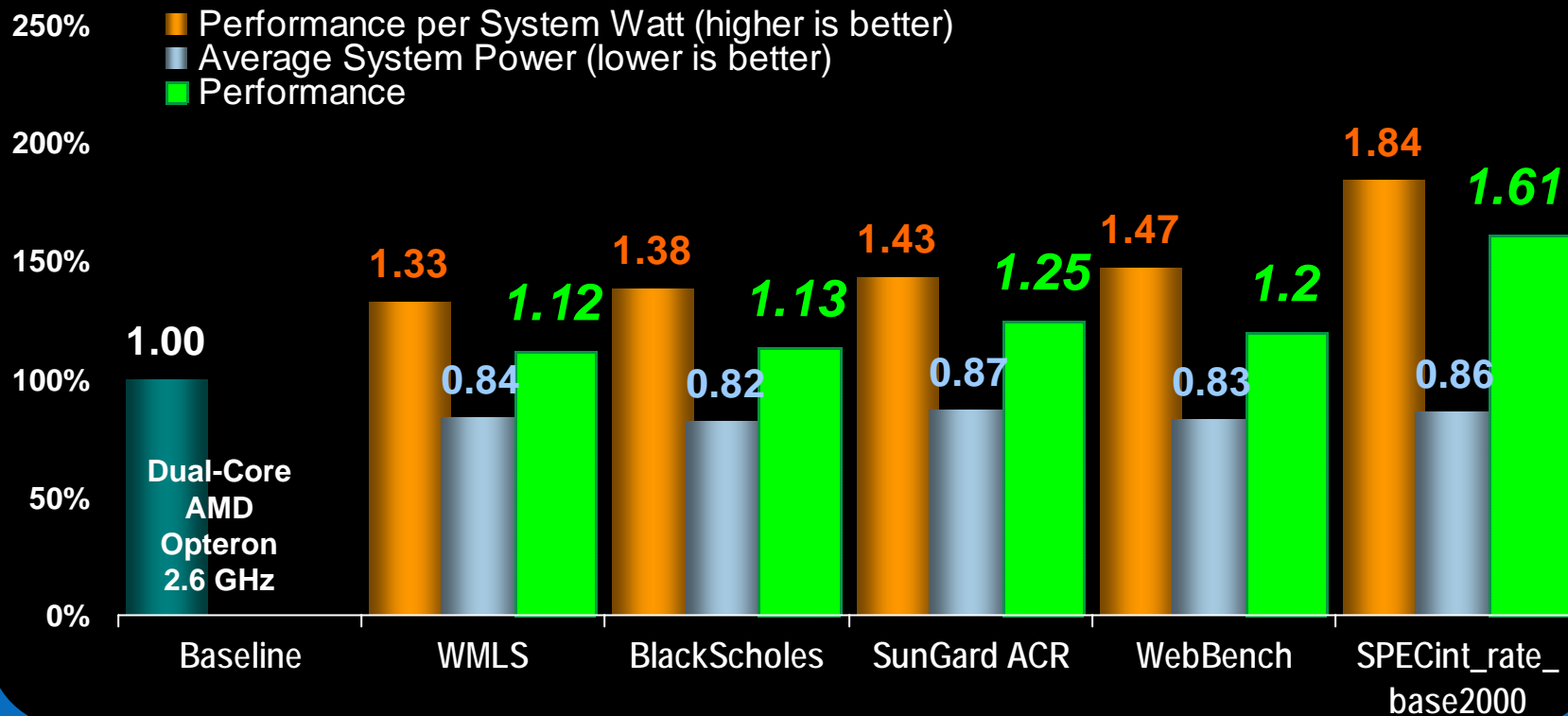
Bensley/Woodcrest Platform

Performance Per System Watt comparison



Details at <http://www.principledtechnologies.com/clients/reports/Intel/Intel.htm>

Dual-Core Intel® Xeon® processor 5160 vs Dual-Core AMD Opteron* 285



Data Source: Published or Submitted results as of May 23, 2006. See backup for details

Energy-efficient Intel Xeon Processor 5160 delivers Perf/Watt leadership

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Tulsa Feature Overview

Large shared 16M L3 cache

- Provides significant performance boost in existing platform!

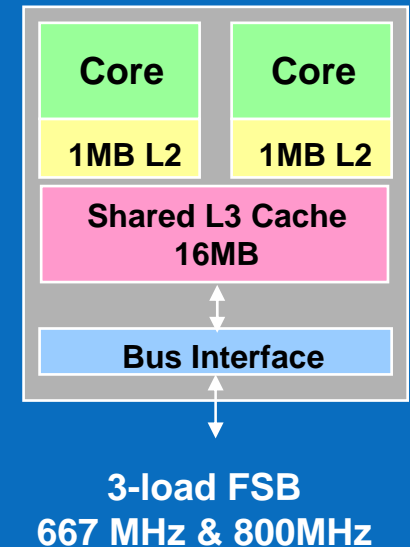
Two cores on single die targeting ≥ 3 GHz core frequency

- Four threads per processor with HT enabled on each core

Designed for existing 667/800 FSB platforms

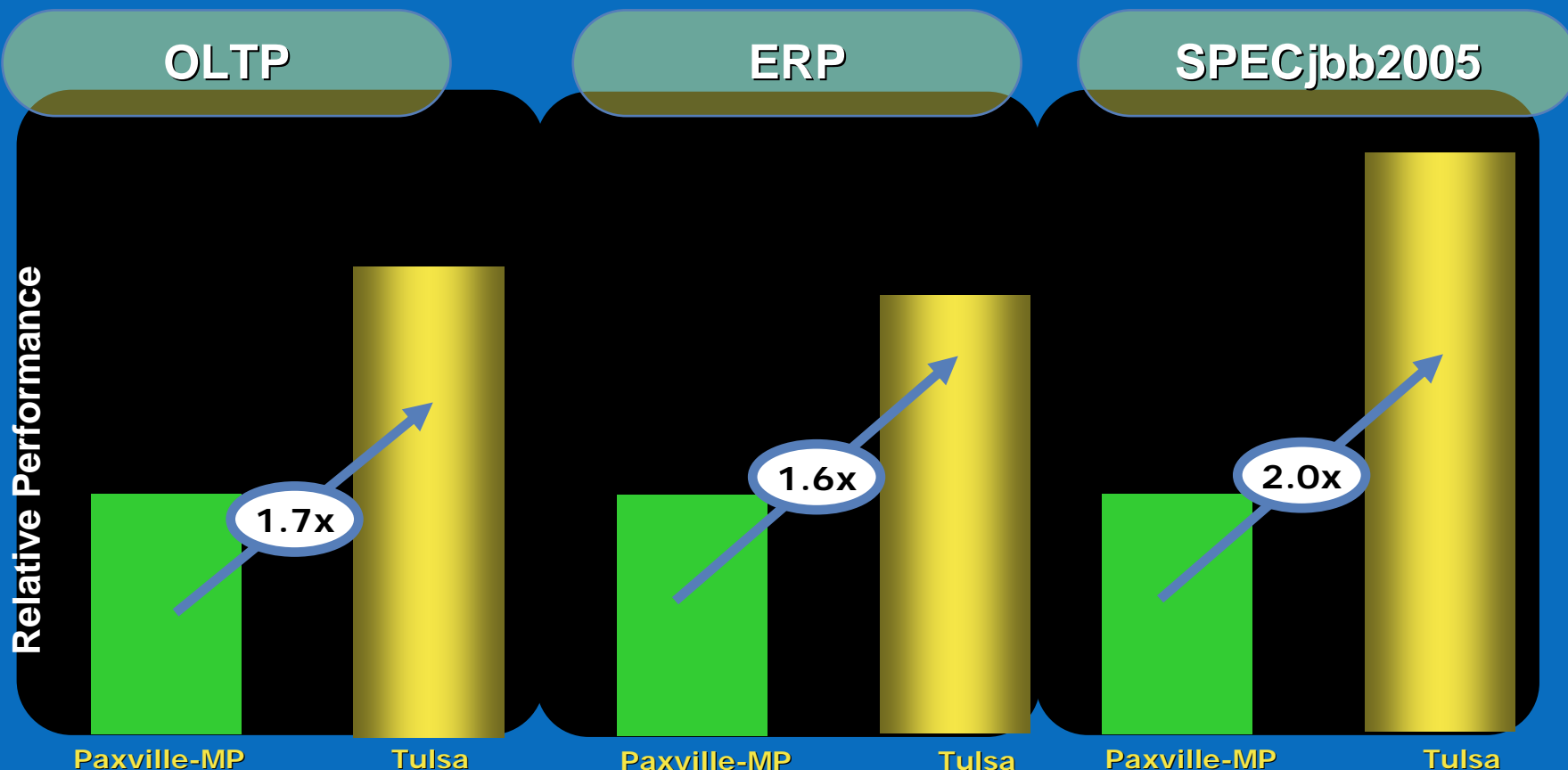
Based on 65nm process technology

- 150 & 95 Watt SKUs
- Intel Cache Tafe Technology for improved RAS
- Virtualization technology for improved robustness & performance
- SMBus system management interface for better manageability



Compelling features enabling a performance boost & improved RAS & manageability

Tulsa-Truland Platform Performance

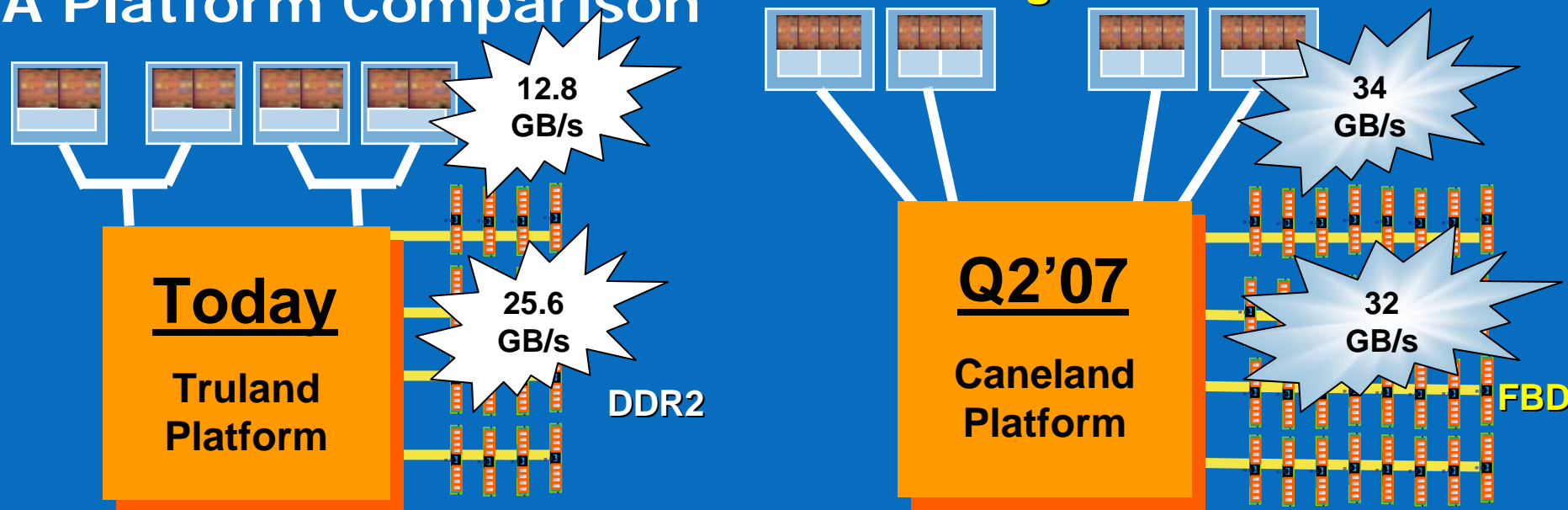


Tulsa provides a significant performance boost on many enterprise applications in 3Q 2006

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Today vs. Tomorrow: A Platform Comparison



	Truland 2006	Caneland 2007	Q3'07 vs. Today
FSB BW peak	12.8 GB/s	34 GB/s	~3x
Aggregate Memory BW	25.6 GB/s (DDR2-400)	32 GB/s (FBD-667)	~1.25x
Memory Capacity	64 GB (DDR2-400, 4GB Dimms)	Up to 128GB (FBD 4GB Dimms)	Up to 2x

Balanced Platform Performance

More Bandwidth & Capacity → Headroom for the Future

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Long Term Leadership...

Industry Firsts

- 65nm manufacturing
- Top to bottom dual core
- HW assisted virtualization
- Feb '06: Quad core demo

Energy-Efficient Performance

- Breakthrough performance
- Improving performance/Watt
- Accelerated product enhancements

Advanced Technologies

- Intel® Virtualization Technology
- Intel® I/O Acceleration Technology
- FB-DIMM for memory BW & capacity
- Best-in-class reliability features



Summary

- Intel leads on 65nm transition, 45 nm projection, & will maintain 2-year Moore's Law cycle
- Intel leads in dual-core volume shipments
- New Intel Core microarchitecture brings Intel performance & performance/watt leadership across desktop, notebook & 2-way server in 2H 2006
- 4-way server performance leadership in 2H 2006 in existing Truland platform
- Further 4-way server performance improvements in 2Q 2007
- Intel server platform architecture delivers leadership performance without integrated memory controller
- Intel has a plan for sustained long term technology leadership

Risk Factors

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Rev. 4/19/06



